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MONKEYS AS RESERVOIRS FOR THE VIRUS OF YELLOW FEVER

George C. LOW

The Lancet, 1914, i.

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Reprinted from THE LANCET, *May* 9, 1914.

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MONKEYS AS RESERVOIRS FOR THE VIRUS OF YELLOW FEVER.

To the Editor of THE LANCET.

SIR,—Though one cannot deny the possibility brought forward by Dr. Andrew Balfour in THE LANCET of April 25th that wild monkeys may act in certain places as reservoirs for the virus of yellow fever, yet anyone especially knowing the West Indies must at once see that this means is uncommon, if in fact it ever occurs at all. Recently numerous theories, chiefly made by people who have never seen yellow fever or studied the disease in its endemic areas, have been brought forward suggesting that animals may act as intermediate hosts or carriers of the virus. Agramonte and others have criticised this idea rightly, and have shown that as regards Cuba there is nothing to support such a view.

The West Indian Islands are, as a matter of fact, a very good place to study such a question, and during a visit paid to these parts in 1901 I had the good fortune to go through a yellow fever epidemic in St. Lucia, and also made observations upon the subject in the other islands as well. From these it is almost certain that the question of an animal host does not exist. If it did, then the disease would always be existent in those parts, and amongst the constant supply of non-immunes visiting these islands cases of definite yellow fever would always be occurring. Now such is not the

case; once the disease is stamped out of the human population the island remains free until some chance importation of a case or of an infected mosquito brings back the virus. Cuba is a case in point; St. Lucia, where I studied the disease, was also so; and Barbados and the other islands also furnish similar examples. Epidemiological researches, then, carried out in suitable areas such as these are against an animal host, and still more strongly so are they against monkeys of any sort, especially red howlers. In most of the West Indian Islands such monkeys do not exist, and one must further remember that the disease occurs, even in places where there are monkeys, practically always in towns where such animals are conspicuous by their absence. The case of the town of Maracaibo, mentioned by Dr. Balfour, is only another example of this well-known fact.

It is right in passing to mention here that there are some monkeys in Barbados, but these live in a semi-preserved condition in a wood miles away from Bridgetown, the chief seaport, and are, I believe, descendants from West African monkeys brought in the old days by the slaves. They are not red howling monkeys, a species inhabiting the forests of Brazil, British Guiana. &c. Further, against the latter monkey being a carrier of the disease is the fact that it abounds, as I have just said, in the woods and forests of British Guiana, where, so far as I know, cases of yellow fever are not met with amongst the non-immunes who traverse those areas. Whilst travelling there in 1901 and investigating the filariasis which is found amongst the aboriginal Indians I had ample proofs of observing the diseases of the country and I never met with yellow fever myself or heard of anyone else having seen it there. When yellow

fever has been met with in British Guiana it has occurred in Georgetown, the chief seaport, or in the other towns of the coast line.

Referring to Dr. Balfour's paper again, I cannot say that the question of importation from the mainland is negatived in the recent small outbreak of yellow fever at Brighton, near the pitch lake in the south-west of Trinidad, nor can I agree with the remarks attributed to Mr. George—namely, "There is not the slightest evidence that the disease was conveyed here from outside sources." Dr. Balfour expressly states that Case 1, an American, had only been five days in Trinidad, and he had arrived there from the *Venezuelan mainland five days before being struck down.* It is perfectly clear to my mind, therefore, that he either acquired the disease on the Venezuelan mainland or on his transit from there to Trinidad. Case 2, who was taken ill almost at the same time as Case 1, is not perhaps so easy to explain as he had not been out of Trinidad for one year and seven months.

There is no doubt that sporadic cases, of what appears at least to be yellow fever, have cropped up from time to time in endemic yellow fever areas. That all of these have been genuine cases one cannot say definitely, because in many instances no necropsies have been performed nor any careful examinations made. In the light of recent research and improved diagnosis it will be interesting to see if such cases still occur.

The finding of bodies, similar to those described by Scott Macfie and Johnston in guinea-pigs and dogs, in monkeys' blood would be interesting, but would mean nothing. It has yet to be proved that these bodies are parasites, and, secondly, even if they are that they have anything to do with the cause of yellow fever. Recently looking at guinea-

pigs' blood with Dr. C. M. Wenyon here in England we have seen bodies very similar to those described by the two observers just mentioned. Before their results can be accepted, therefore, confirmation must be forthcoming. I do not propose to enter into the controversy of Seidelin's bodies here at this moment. Agramonte, Schilling, Guiteras, and others, all very competent observers, have already done so, and their opinion is certainly against them.—I am, Sir, yours faithfully,

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Bentinck-street, W., May 1st, 1914.

Printed at The Lancet Office,
423 Strand, London, W.C.

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